20. A comprehensive aircraft monitoring and recording system for a turbine engine wherein the engine manufacturer has established certain normal maximum temperature and torque levels for said engine, said unit comprising:

means for measuring turbine engine temperature; means for measuring turbine engine speed; means for measuring turbine engine torque; means for measuring turbine engine fuel flow; means for measuring the number of times said turbine engine is operated; means for measuring the total operating time of said turbine engine; data processing circuit means for periodically sampling all of the foregoing measured quantities, and for determining when the temperature and/or torque exceeds the manufacturer's normal maximum rated temperature and/or torque figures;

means for recording the duration and approximate maximum exceedance level for each time that the turbine engine is operated beyond the manufacturer's normal rated maximum torque and/or temperature;

means for permanently storing data on (1) each exceedance, (2) engine run time, (3) the number of times the engine has been operated, and (4) total exceedance time;

means for transmitting all of selected portions of said permanently stored data to a location spaced from said unit, upon command;

means for numerically displaying selected data from said system;

means for mounting said numerical display means in the cockpit of the aircraft; and

switching means in the cockpit for actuation by the pilot for selecting any of at least ten desired sensed or calculated information or data, to be displayed.

21. A comprehensive turbine engine monitoring and recording system as defined in claim 20 further including means for recording the time of occurrence of each exceedance.

22. A system as defined in claim 20 further comprising means for establishing a plurality of levels of bands of engine operation relating to critical engine parameters such as temperature, engine speed, or torque, with such levels being closely related to the rated maximum operating limits of said engine, and means for recording the time of operation in each of said levels of bands.

23. A comprehensive aircraft turbine engine monitoring and recording system whereby said turbine engine has predetermined maximum normal operating parameters, said system comprising:

means for establishing at least three levels or bands of engine operation relating to critical engine parameters such as temperature, engine speed or torque, with such levels being closely related to the rated maximum operating limits of said engine,

means for recording the time of operation of said engine in each of said levels or bands;

non-volatile storage means for permanently storing data giving the duration and magnitude of exceedances when the engine is operated above said limits, and the total duration of the exceedances;

means for recording and processing data required for turbine engine trend monitoring, including means for calculating horsepower and the air density index factor, and the resultant optimum fuel flow rate, engine speed and engine temperature under these horsepower and air density conditions;

means for determining the actual fuel flow rate, engine speed and engine temperature; and

means for determining the variances from the optimum for the fuel flow rate, the engine speed and the engine temperature;

means for numerically displaying selected data from said system;

means for mounting said numerical display means in the cockpit of the aircraft; and

switching means in the cockpit for actuation by the pilot for selecting any of at least ten desired sensed or calculated information or data, to be displayed;

whereby an evaluation of the engine degradation trend may be made for purposes of power assurance, engine overhaul scheduling, or the like.

24. A comprehensive turbine engine monitoring and recording system as defined in claim 23 further including means for recording the time of occurrence of each exceedance.

25. A comprehensive turbine engine monitoring and recording system as defined in 23 further comprising means for permanently storing in nonvolatile storage the total running time of said turbine engine.

26. A system as defined in claim 23 including a remote computer and a graphics printer for displaying said data, and means for coupling said computer and printer to receive data from said system.

27. A comprehensive turbine engine monitoring and recording system as defined in claim 23 further comprising means for selectively transmitting all or selected portions of the permanently stored data to a location spaced from said system, upon command.

28. A system as defined in claim 27 further comprising means for displaying selected data transmitted from said system.

29. A comprehensive aircraft turbine monitoring and recording system, comprising:

an electronic data processing unit including a permanent non-volatile memory;

means for supplying to said data processing unit substantially all of the major aircraft operational data and the turbine operating parameters, for storage of this information by said data processing unit;

a cockpit mounted display unit coupled to said data processing unit, and including switch means for selecting any of at least ten desired aircraft operational data or turbine operating parameters and for displaying the selected data;

whereby detailed aircraft turbine engine data is available for display, as well as altitude and other aircraft operating data which may be selectively obtained for standby or check purposes in the event of cockpit instrumentation failure.

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